(5) The question of the origin of megalithic monuments and of the race by whom they were constructed has acquired fresh importance from the discussion, at the recent meeting of the British Association at Dundee, of the theories advanced by Prof. G. Elliot Smith, who attributes them to influence from Egypt, where he assumes that the invention of copper led to the use of carved stone. Mr. Peet's method in the present book is to give a summary account of megalithic monuments throughout the world, to which he adds some cautious, well-considered speculations on their origin and diffusion. He fully recognises the difficulty, in the present state of our knowledge, of deciding the centre from which they were derived. He suggests that the idea of the rock-tomb was brought into the megalithic area by the builders of the monuments, that it did not result from contact with the eastern Mediterranean, and that there is no direct connection between the corridor tombs of the megalithic countries and the great Tholoi of Crete and the Greek mainland. The book may be safely recommended as a cautious summary of a most difficult problem.

RECENT BOOKS ON PHYSICAL SUBJECTS.

(1) *Elements and Electrons.* By Sir W. Ramsay, K.C.B., F.R.S. Pp. ix+173. (London and New York: Harper and Brothers, 1912.) Price 2*s.* 6*d.* net. (Harper's Library of Living Thought.)

(2) *Radium and Radioactivity.* By A. T. Cameron. Pp. 185. (London: S.P.C.K., 1912.) Price 2*s.* 6*d.* (Romance of Science Series.)

(3) *A Handbook of Physics.* By W. H. White. Pp. xv+667. (London: Methuen and Co., Ltd., n.d.) Price 7*s.* 6*d.*

(4) *A Course of Physics, Practical and Theoretical.* By Dr. C. H. Draper. Pp. xi+413. (London: Blackie and Son, Ltd., 1912.) Price 4*s.* 6*d.* net.

(5) *La Théorie des Ions et l'Electrolyse.* Deuxième Édition. By A. Hollard. Pp. vii+220. (Paris: Gauthier-Villars, 1912.) Price 5 francs.

(6) *Lehrbuch der Optik.* Dritte erweiterte Auflage. By Dr. Paul Drude. Herausgegeben von Dr. E. Gehrcke. Pp. xvi+548. (Leipzig: S. Hirzel, 1912.) Price 12 marks.

(7) *Electricity and Its Practical Applications.* By Prof. M. Maclean. Pp. xiv+492. (London: Blackie and Son, Ltd., n.d.) Price 10*s.* 6*d.* net.

(1) IT need scarcely be stated that a popular treatise from the pen of Sir William Ramsay is sure to be of absorbing interest. This is particularly the case with the present volume, with the subject of which the author's name is so intimately associated. The various stages in the development of chemistry, and later of radioactivity, are sketched in a manner quite delightful, and although the treatment of the mechanics involved may be regarded by some as rather loose, it is only in a few instances that this objection can be raised, and it should be remembered that, after all, the readers will not all be strict mathematicians.

The principal chapters are those which deal with Dalton's atomic theory, molecular weights, the periodic table, molecules—invisible and visible—electrons, radioactivity and transmutation. Probably the last of these is that which will invoke the greatest interest. It is common knowledge that Sir William Ramsay's work in this field has been received in some quarters with scepticism, and, of course, all controversies are popular. The author draws a distinction between "transmutation" and "transformation," the former applying to controlled changes as distinct from natural changes. Among the reasons brought forward as indicating the probable effect of corpuscular bombardment in producing transmutation, it is suggested that it may be due to high temperature. The "temperature" of rapidly moving alpha particles is calculated upon the kinetic theory, and the number obtained is enormous.

With this view it is difficult to agree, for even if we admit the validity of this calculation as representing the temperature of the particles themselves, it cannot be claimed that it also measures the temperature of the body bombarded. But apart from this, the accumulated evidence of transmutation which is recorded in this chapter should not be lightly dismissed, especially coming as it does from the discoverer of the spontaneous production of helium from radium. It may be scarcely credible, because so extraordinary, but it may, nevertheless, be true.

(2) This is another little book on somewhat similar lines, although, in this case, radioactivity is the sole subject. The author takes the very reasonable view that some knowledge of physics and chemistry must be assumed in the reader, but the calls on this knowledge are neither great nor numerous, and will form no bar to the majority of students. A straightforward and interesting account of the main radioactive phenomena constitutes the contents of the book, and the novice who desires some acquaintance with this wonderful new subject could not do better than acquire a copy.

(3) It is not often that one comes across a text-book exhibiting so much originality as that which Mr. White has recently produced. To say that

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it differs from the ordinary text-book scarcely expresses the truth of the matter. It is so often found that a new book on physics merely consists of previous works *plus* a few modifications and additions. Here, however, internal evidence makes it perfectly clear from page to page that the author is indeed the author.

The book is a very good one indeed, and should find a large sale among those students of physics who need in a single volume a treatment of the subject rather more than elementary. It is true that in many places the illustrations of physical principles used verge on the ludicrous, and that the mode of expression often seems out of place, but the redeeming feature is that the illustrations are excellent. It may be said, in fact, that by reason of the frequent recourse to everyday occurrences as constituting examples of various physical phenomena this book is chiefly noteworthy. A few of them, notably those connected with physiological processes, may, perhaps, be beyond the average student, but the author has evidently introduced them for the special benefit of students of medicine. One undesirable feature may be mentioned in conclusion, namely, the fact that the author has attempted in several places to conduct algebraic calculations in words instead of symbols, the result being that the reasoning, although correct, is very difficult to grasp.

(4) This is a combined theoretical and practical text-book intended for schools, and to be covered normally on a three-years' course. In most respects it resembles the usual school-book. It is, however, a good plan to describe in one volume the methods of doing experiments and the theoretical treatment of the principles involved.

(5) The author of this book has produced a useful record of much of the experimental work which has been done on electrolysis, and interprets the results upon the theory of ionisation. He claims that the simple theory, although admittedly inapplicable to concentrated solutions, yet may afford a basis to which modifications may be made, just as did Mariotte's and Gay-Lussac's laws for gases. The subject is divided into four sections, namely, the constitution of electrolytes, their conductivity, contact potential, and electrical energy. A considerable number of tables are given recording numerical values of such quantities as heats of ionisation and conductivities of acid solutions of various strengths.

(6) In a book having the reputation of the late Prof. Drude's "Optics," the chief interest in the appearance of the third edition is attached to the modifications and additions introduced. Such a book would be hard to improve, and might easily be spoilt. Prof. Gehrcke has wisely refrained from making any serious alterations, and the additions are few in number, the principal being a short description of Stokes's theory of aberration and a paragraph or so on the photochemical effect on gases. The treatise is still Drude's "Optics," and will continue to merit the high place it already holds in physical science.

(7) This volume has been written for the use of students of electrical engineering. It consists of the treatment of magnetism and electricity, first of all from the theoretical point of view, and then in connection with its various applications. The mathematical treatment is quite elementary—it is, in fact, based on Deschanel's "Natural Philosophy," so far as the purely theoretical part is concerned, many of the diagrams also being reproduced from that treatise. A series of tables of constants and various questions and exercises add to the value of the book, which appears to be well fitted for its purpose.

OUR BOOKSHELF.

La Cementazione dell' Acciaio. By Dr. Frederico Giolitti. Pp. xi+506. (Torino: Unione Tipografico-Editrice Torinese, 1912.)

IN the present work, Prof. Giolitti has collected together the important experimental results obtained by his fellow-workers during the last four years relative to the cementation of steel. At the same time, he has presented an exhaustive review of the subject from its scientific and technical aspects. The chemical nature of the process of cementation (in which term case-hardening is included) has been the subject of many controversies, and it cannot be said that the mechanism of the transport of carbon is even now understood. Prof. Giolitti subjects the extensive literature of the question to a critical review, which does not appear to omit any work of importance, English and German memoirs being examined as thoroughly as those in Italian and French. This part of the book might, perhaps, have been somewhat condensed by the omission of repetitions, but it forms an excellent source of reference for a class of facts of great importance for the general theory of metallic alloys. The chapter in which the results of previous investigations are summed up scarcely gives sufficient attention to the fact, now fully established, that carbon diffuses in the solid as a carbide, and not in the free state.

The author's own researches, which occupy the larger part of the book, deal mainly with the specific influences of carburising gases (hydrocarbons and carbon monoxide, alone or in the presence of solid carbon) in the process of cementation. Details are given of the experimental conditions employed, and of the technical processes based on the experiments. The methods are of great scientific as well as technical interest as examples of the application of a purely physico-chemical study of equilibrium to an industrial

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